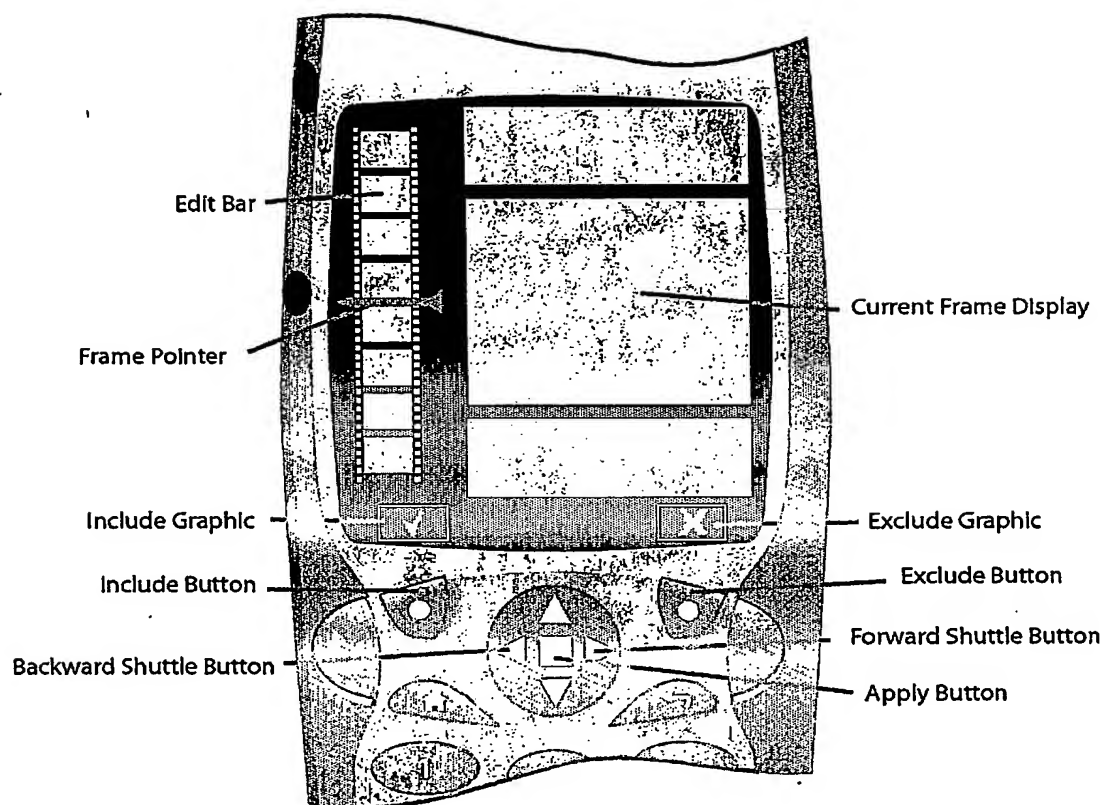


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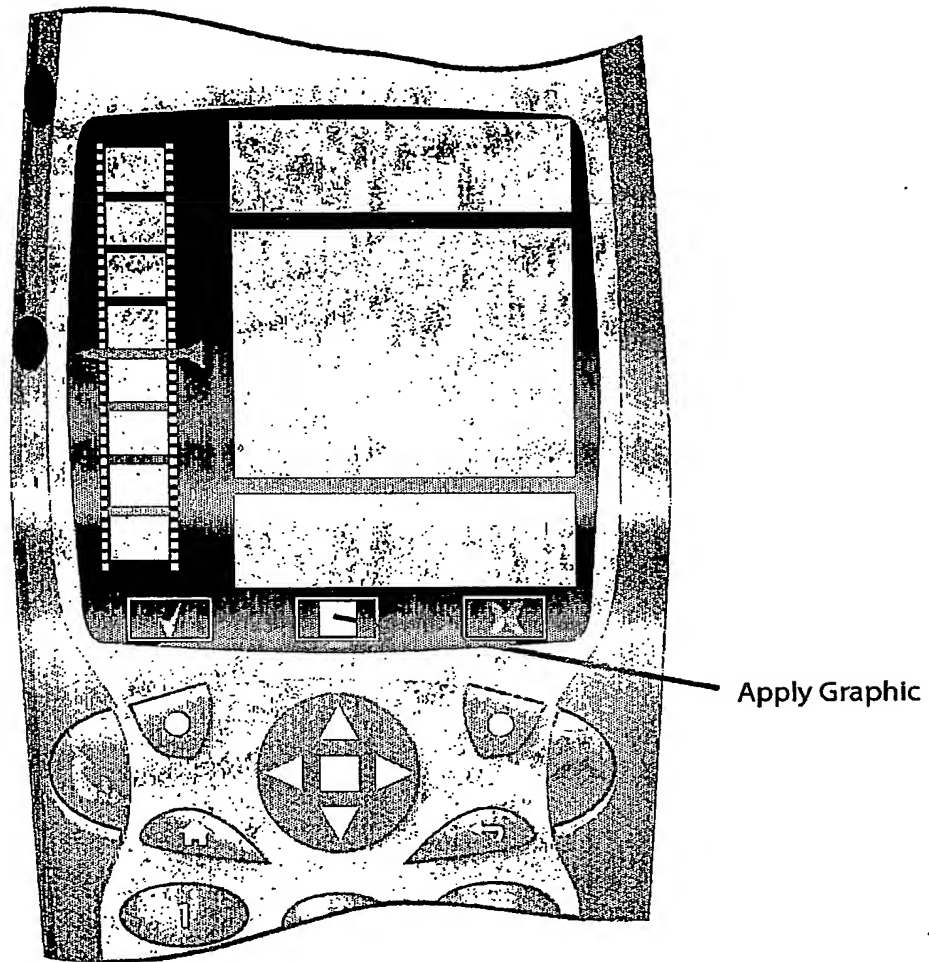
Figure 1



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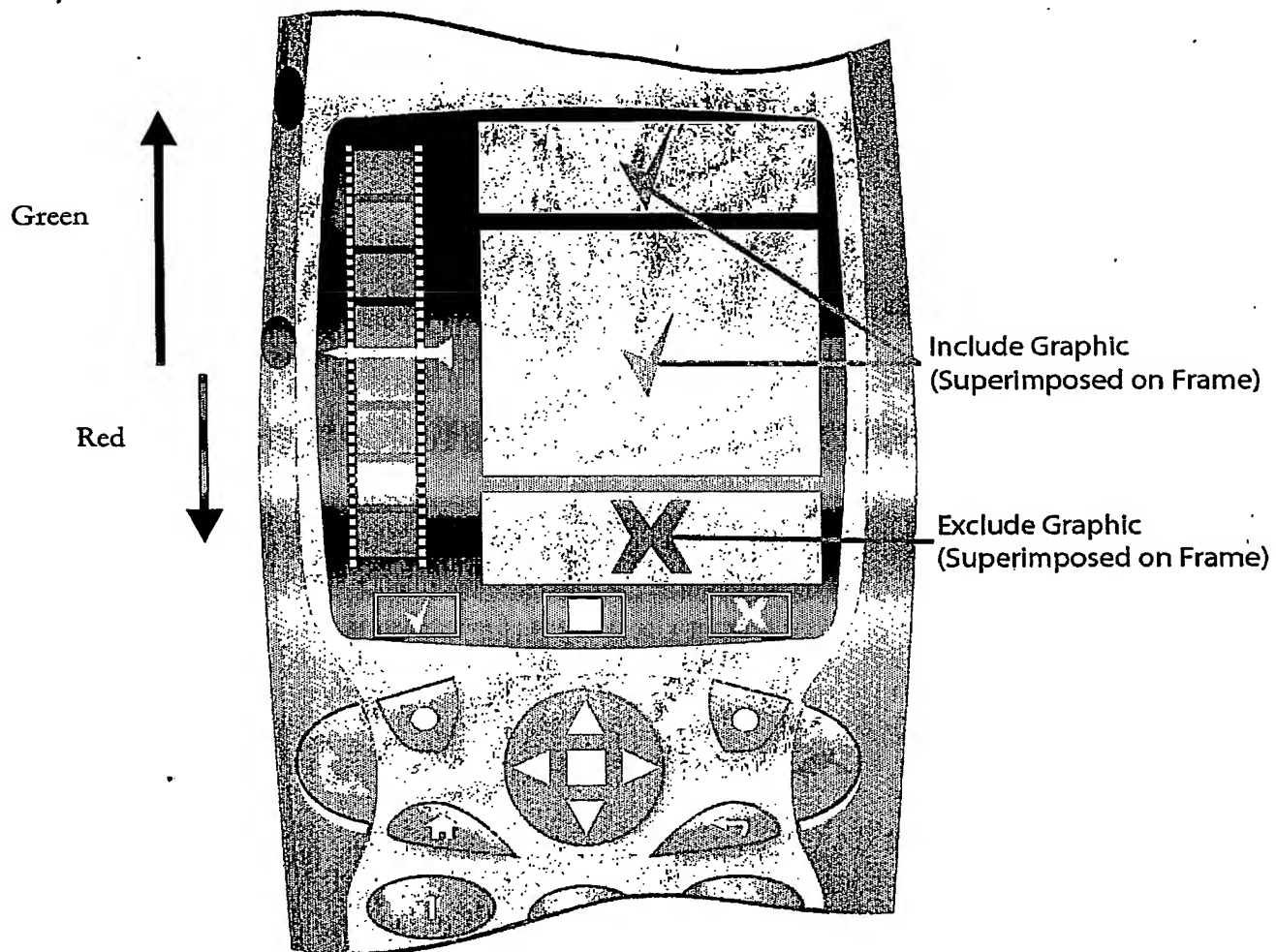
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Figure 2



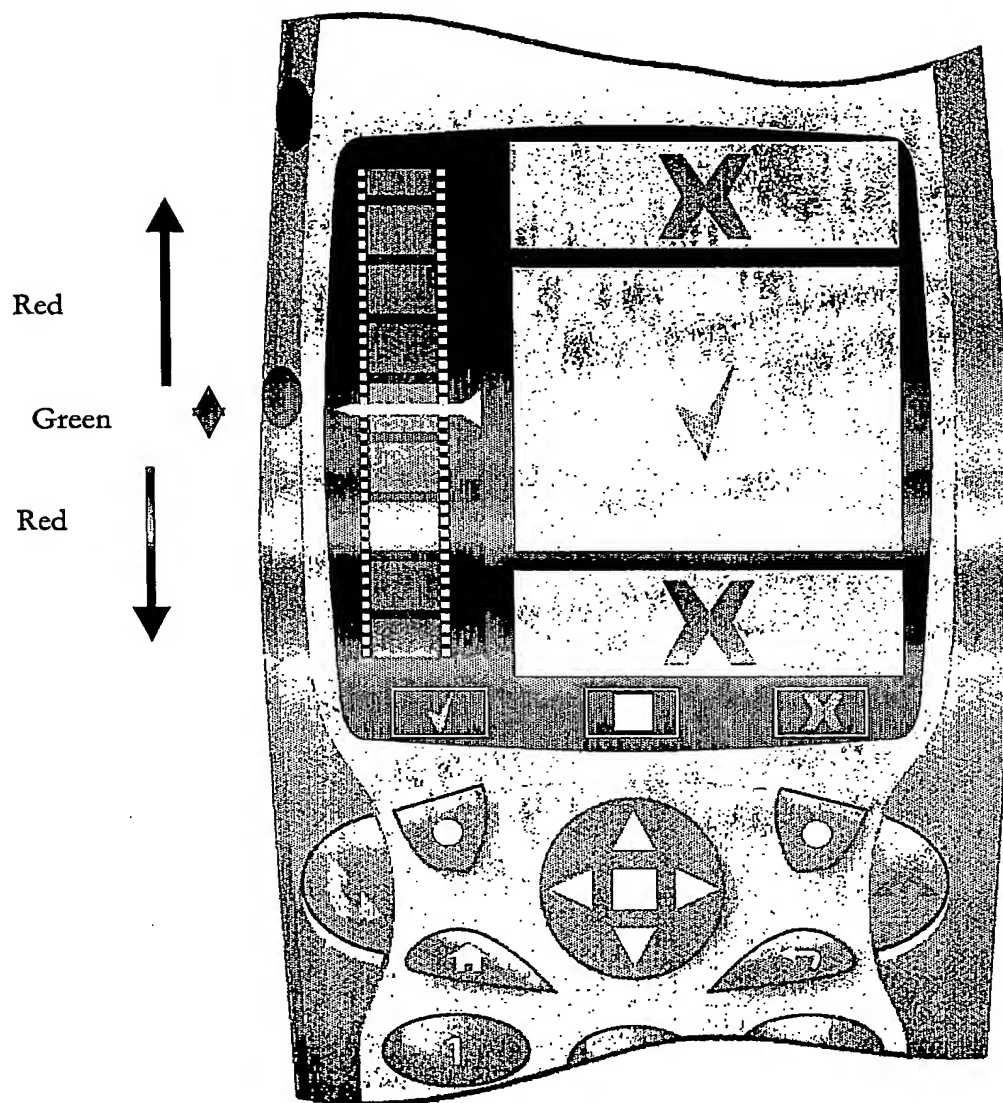
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Figure 3



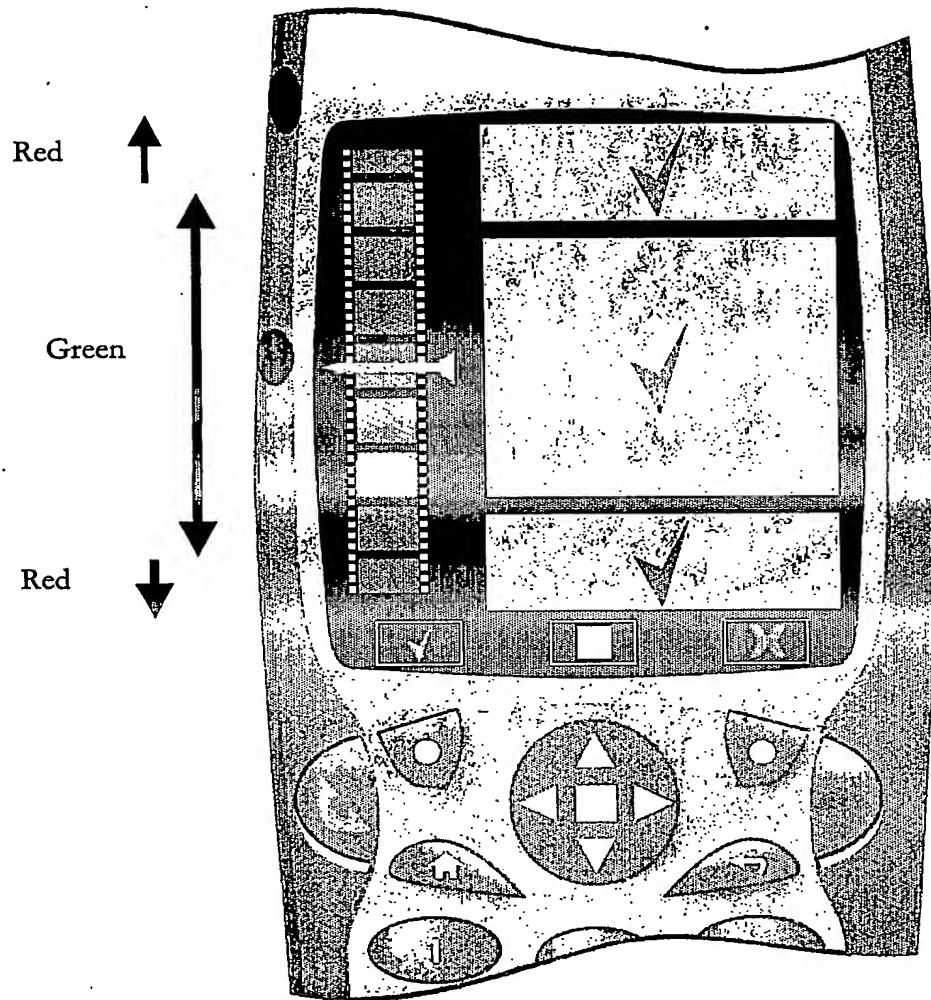
4/15

Figure 4



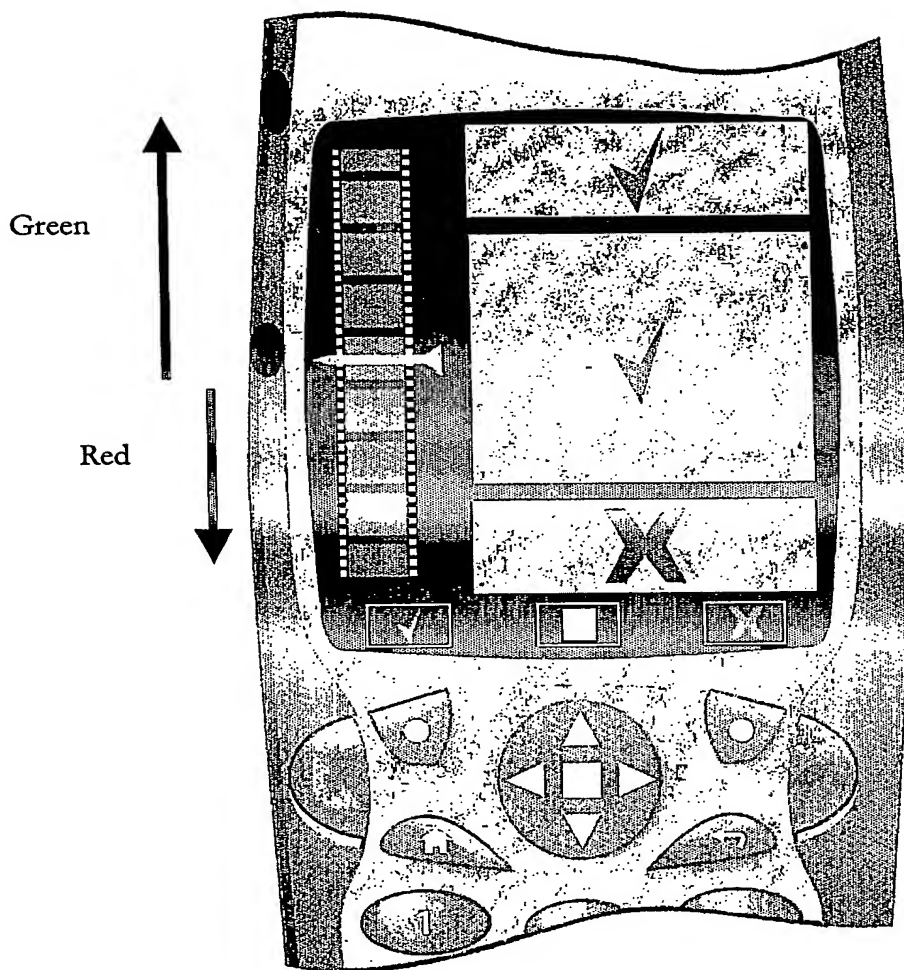
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Figure 5



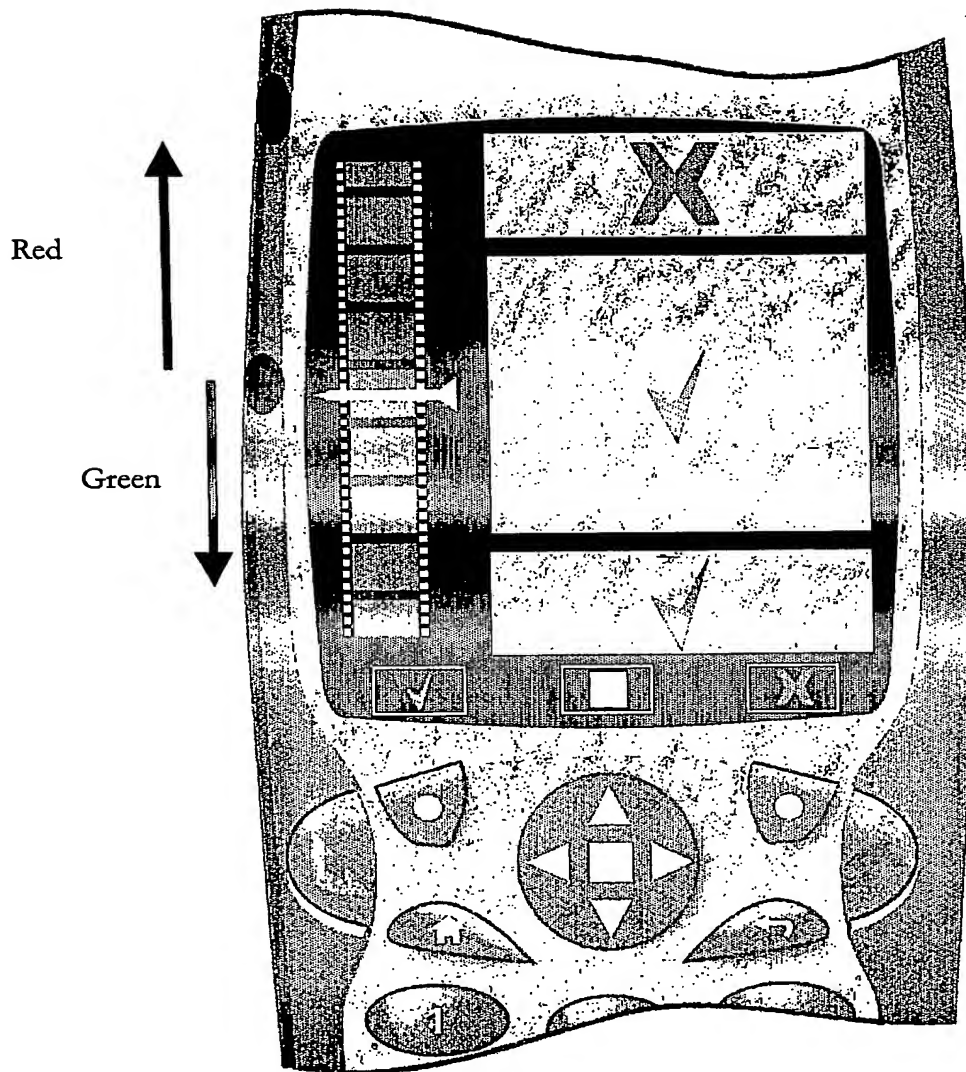
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Figure 6



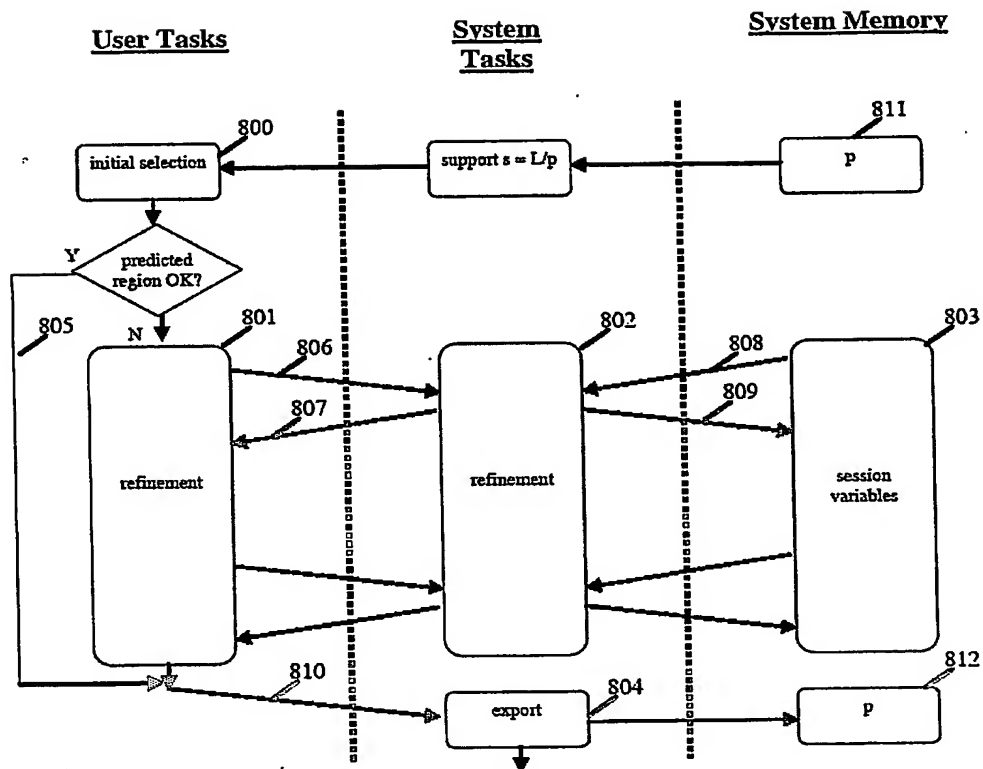
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Figure 7



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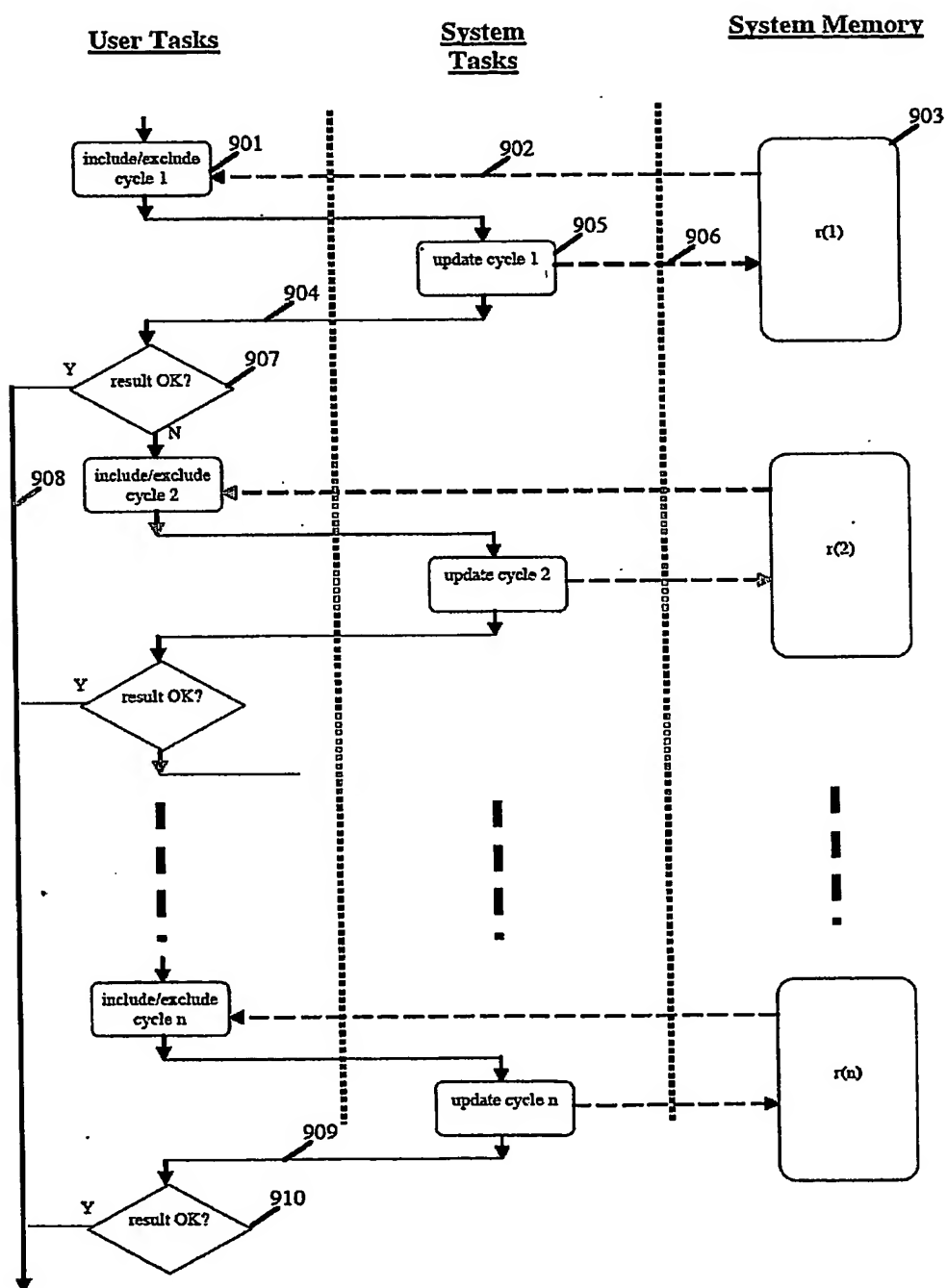
Figure 8





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Figure 9



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Figure 10

```

////////////////////////////////////
// example VXT control program

#define MAX_USER_INTERACTIONS    100

// session variables

static int p = 12;                // predicted value in s = L/p
static int r [MAX_USER_INTERACTIONS];

enum user_commands
{
    USER_MOVE_TO_FRAME,
    USER_INCLUDE,
    USER_EXCLUDE,
    USER_APPLY
};

void VXT_control_example()
{
    int L;                        // length of video clip in frames
    int s;                        // support in frames
    int current_user_input;
    int user_interaction_index; // count number of user edits
    int user_cycle_count;
    int inpoint, temp_inpoint;
    int outpoint, temp_outpoint;
    int f;                        // current frame number

    L = getVideoClipLength();    // get the number of frames in the video clip

    // The support value s specifies the size of the block of frames to be
    // included or excluded in the refinement operations.
    // It is initialised to be some proportion of the original clip length
    // using the stored prediction variable p.
    s = L/p;

    user_interaction_index = 0;
    user_cycle_count = 0;

    // show the predicted include region
    f = L/2;
    inpoint = f - s;
    outpoint = f + s;
    temp_inpoint = inpoint;
    temp_outpoint = outpoint;
    showIncludeRegion(f, inpoint, outpoint, L, -1);

    // user input decode loop
    while (((current_user_input = getUserInput()) != USER_APPLY) &&
           (user_interaction_index < MAX_USER_INTERACTIONS))
    {
        s += getRefinementValue(user_interaction_index);    // adjust s for this iteration
        switch(current_user_input)
        {
            case USER_MOVE_TO_FRAME :    // move and include frames moved across
                user_interaction_index++;
                f = getCurrentFrame();
                temp_inpoint = (f < temp_inpoint) ? f : temp_inpoint;
                temp_outpoint = (f > temp_outpoint) ? f : temp_outpoint;
                inpoint = temp_inpoint;
                outpoint = temp_outpoint;
                user_cycle_count = 0;
                showIncludeRegion(f, temp_inpoint, temp_outpoint, L, -3);
                break;
            case USER_INCLUDE :

```

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```

switch(user_cycle_count)
{
    case 0:    // include current frame only
                temp_inpoint = f;
                temp_outpoint = f;
                break;
    case 1:    // include s frames both prior to and subsequent to current one
                temp_inpoint = (f - s) < inpoint ? (f - s) : inpoint;
                temp_outpoint = (f + s) > outpoint ? (f + s) : outpoint;
                break;
    case 2:    // include all frames prior to and s frames subsequent to
current one
                temp_inpoint = 0;
                temp_outpoint = f + s;
                break;
    case 3:    // include s frames prior to and all frames subsequent to
current one
                temp_inpoint = (f - s);
                temp_outpoint = L - 1;
                break;
}
user_cycle_count = (user_cycle_count < 4) ? user_cycle_count + 1 : 0;
showIncludeRegion(f, temp_inpoint, temp_outpoint, L, user_cycle_count);
break;
case USER_EXCLUDE :
switch(user_cycle_count)
{
    case 0:    // exclude all but current frame (equivalent to
USER_INCLUDE case 0:).
                temp_inpoint = f;
                temp_outpoint = f;
                break;
    case 1:    // exclude s frames from front and back of clip
                temp_inpoint = s;
                temp_outpoint = L - s;
                break;
    case 2:    // exclude s frames from back of included region
                temp_inpoint = f - s;
                temp_outpoint = f;
                break;
    case 3:    // exclude s frames from front of included region
                temp_inpoint = f;
                temp_outpoint = f + s;
                break;
}
user_cycle_count = (user_cycle_count < 4) ? user_cycle_count + 1 : 0;
showIncludeRegion(f, temp_inpoint, temp_outpoint, L, user_cycle_count);
break;
}
inpoint = temp_inpoint;
outpoint = temp_outpoint;

// update the variables and export the clip
p = 2*L/(outpoint - inpoint + 1);
exportClip(f, inpoint, outpoint, L);
}

```

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NEW SESSION - INCLUDE example - take prediction

input: \_\_\_\_\_ \*\*\*\*\*#\_\_\_\_\_

export: \_\_\_\_\_ \*\*\*\*\*#\_\_\_\_\_

KEY

--- excluded region

\*\*\*\*\* included region

# current frame

Figure 11

NEW SESSION - INCLUDE example - extend region post-current frame

input: \_\_\_\_\_ \*\*\*\*\*#\_\_\_\_\_

moveto: \_\_\_\_\_ \*\*\*\*\*#\_\_\_\_\_

export: \_\_\_\_\_ \*\*\*\*\*#\_\_\_\_\_

NEW SESSION - INCLUDE example - extend region pre-current frame

input: \_\_\_\_\_ \*\*\*\*\*#\_\_\_\_\_

moveto: \_\_\_\_\_ #\_\_\_\_\_

export: \_\_\_\_\_ #\_\_\_\_\_

KEY

--- excluded region

\*\*\*\*\* included region

# current frame

Figure 12

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NEW SESSION - INCLUDE example - take 1 frame

```

input:_____*****#_____
moveto:_____#_____
cycle1:_____#_____
export:_____#_____

KEY
---- excluded region
***** included region
# current frame

```

Figure 13

NEW SESSION - INCLUDE example - grow region post-current frame

```

input:_____*****#_____
moveto:_____*****#_____
cycle1:_____#_____
cycle 2:_____*****#_____
moveto:_____*****#_____
cycle1:_____#_____
cycle 2:_____*****#_____
export:_____*****#_____

```

NEW SESSION - INCLUDE example - grow region pre-current frame

```

input:_____*****#_____
moveto:_____#_____
cycle1:_____#_____
cycle 2:_____*****#_____
moveto:_____#_____
cycle1:_____#_____
cycle 2:_____*****#_____
export:_____*****#_____

```

KEY

---- excluded region

\*\*\*\*\* included region

# current frame

Figure 14

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NEW SESSION - INCLUDE example - include all pre-current frames

```

input:_____*****#_____
moveto:_____*****#_____
cycle
1:_____#_____
cycle 2:_____*****#_____
cycle 3:*****#_____
export:*****#_____

```

NEW SESSION - INCLUDE example - include all post-current frames

```

input:_____*****#_____
moveto:_____*****#_____
cycle
1:_____#_____
cycle 2:_____*****#_____
cycle 3:*****#_____
cycle 4:_____*****#_____
export:_____*****#_____

```

## KEY

---- excluded region

\*\*\*\*\* included region

# current frame

Figure 15

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NEW SESSION - EXCLUDE example - exclude s frames from front and back of clip

input: \_\_\_\_\_ \*\*\*\*\*#\_\_\_\_\_

moveto: \_\_\_\_\_ \*\*\*\*\*#\_\_\_\_\_

cycle

1: \_\_\_\_\_ #\_\_\_\_\_

cycle 2: \_\_\_\_\_ \*\*\*\*\*#\_\_\_\_\_

export: \_\_\_\_\_ \*\*\*\*\*#\_\_\_\_\_

## KEY

---- excluded region

\*\*\*\*\* included region

# current frame

Figure 16

NEW SESSION - EXCLUDE example - exclude s frames from front of included region

input: \_\_\_\_\_ \*\*\*\*\*#\_\_\_\_\_

moveto: \_\_\_\_\_ \*\*\*\*\*#\_\_\_\_\_

cycle

1: \_\_\_\_\_ #\_\_\_\_\_

cycle 2: \_\_\_\_\_ \*\*\*\*\*#\_\_\_\_\_

cycle

3: \_\_\_\_\_ \*\*\*\*\*#\_\_\_\_\_

export: \_\_\_\_\_ \*\*\*\*\*#\_\_\_\_\_

## KEY

---- excluded region

\*\*\*\*\* included region

# current frame

Figure 17

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